

National Coastal Assessment: Approach and Findings in the Northeast

Henry Walker ¹, John Kiddon ¹,
Harry Buffum², Michael Charpentier²,
Gerald Pesch¹, Donald Cobb¹, and Walt Galloway¹

¹ Atlantic Ecology Division
National Health and Environmental Effects Research Laboratory
U.S. Environmental Protection Agency
Narragansett, Rhode Island 02882

² CSC Corporation
Narragansett, Rhode Island 02882

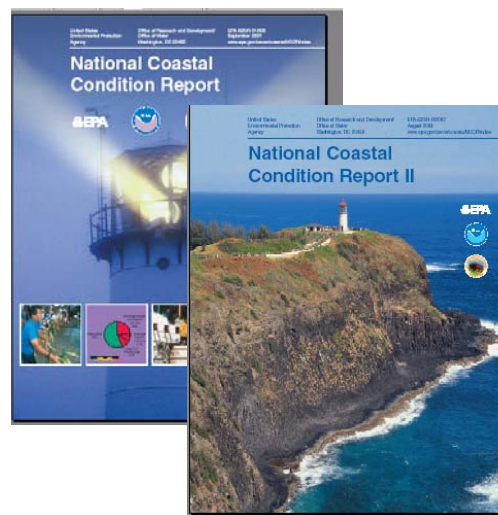
National Coastal Assessment Approach and Findings in the Northeast

Implementation of the NCA in the Northeast

- Goals
- Strategy
- Approach



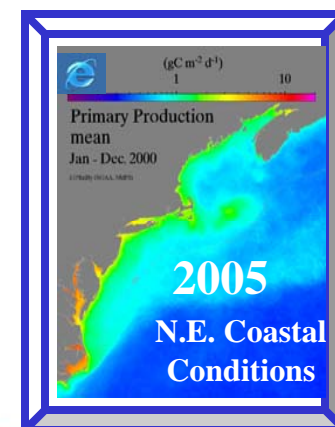
Broad – National Coastal Surveys



Preliminary Findings

Next Steps for Analysis & Reporting

- Electronic Web-Based Reporting, possibly with active links to: 1) NCA data, 2) Analysis Tools, 3) National Estuary Programs, & 4) State Environmental Management Programs



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment

Addressing some basic research questions:

- What are the conditions of estuarine resources in the U.S., how are they changing, and what are the causes of those changes?
 - To document conditions, we need to systematically gather data, in addition to taping into expert opinion
- How well different coastal condition indicators, and monitoring designs work?



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment



Goals:

- **Assess the ecological condition of estuarine resources.**
 - Based on unbiased data of known quality
- **Determine reference conditions for studies on ecological responses / stressors.**
- **Build infrastructure in states and EPA Regions.**



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment



Strategy:

- Partner with state resource agencies for collection, processing, and analysis of samples
- Develop state and regional infrastructure
- Develop state and regional understanding



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment



Key NCA Contacts in the Northeastern U.S.

Name	State
Walker, Henry	EPA-AED
Kiddon, John	EPA-AED
Bengi, Sandy	EPA-AED
Paul, John	EPA-NHEERL
Pesch, Gerald	EPA-AED
Galloway, Walt	EPA-AED
Cobb, Don	EPA-AED
Berry, Walter	EPA-AED
Latimer, James	EPA-AED
Dettmann, Edward	EPA-AED
Buffum, Harry	EPA-AED
Copeland, Jane	CSC
Charpentier, Mike	CSC
Simcox, Alison	EPA Region 1
Robinson, Keith	USGS
Moore, Richard	USGS
ANNOTATED NCA Contacts List	
Arthur D. Little Lab	C2000
TRAC Laboratories	C2000
Barry Vittor and Assoc.	C2000
ERI Lab	NCA
TAI Environmental	NCA
Page	
Banach, Fred <i>retired</i>	CT
Lyman, Matt	CT
Hoffman, Guy	CT
Howell, Penny	CT
Johnson, Mark	CT
Millus, Julie	CT
Olsen, Christine	CT
Perkins, Chris	CT
Simpson, Dave	CT
Stacey, Paul	CT

Anderson, Ben	DE
Fikslin, Tom	DE
Huerta, Sergio	DE
Kineon, Forsyth	NJ & DE
Knowles, Kathy	DE
McCleary, Barbara	DE
McQuaide, Dave	DE
Onken, Gary	DE
Otto, Carolyn	DE
Santoro, Ed	NJ & DE
Page	
Adams, Darvene	EPA
Braun, Randy	EPA
Craven, George	EPA
Gould, Diane	EPA
Heath, Ellen	EPA
Kurtenback, Jim	EPA
Libertz, Catherine	EPA
Macauley, John	EPA
Nolan, Peter	EPA
Snook, Hilary	EPA
Summers, Kevin	EPA
Tedesco, Mark	EPA
Thompson, Ray (retired 12/2002)	EPA
Page	
Baker, Jason	MA
Bucholtz ten Brink, Marilyn	MA
Gardner, Bernie	MA
Howe, Arnie (retired 11/2002)	MA
Johnson, Arthur S.	MA
Keag, Ken	MA
Krahforst, Christian	MA
Smith, Jan	MA
Snow-Cotter, Susan	MA
Turner, Jefferson	MA
Wallace, Gordon	MA

Barker, Seth	ME
Bayley-Smith, Beverly	ME
Churchill, Lureese	ME
Courtemanch, Dave	ME
Doggett, Lee	ME
Groves, Katherine (departed 9/02)	ME
Langton, Rich	ME
LaPointe, George	ME
Lazzari, Mark	ME
Legden, Kathleen	ME
Mercer, Linda	ME
Sherman, Sally	ME
Sowles, John	ME
Young, Karen	ME
Page	
Baczynski, Robert	NH
Currier, Paul	NH
Dreisig, John	NH
Jones, Steve	NH
Lamson, Deb	NH
Landry, Natalie	NH
McLaughlin, Joanne	NH
Nash, Chris	NH
Raiche, Paul	NH
Shag, Dave	NH
Trowbridge, Phil	NH
Page	
Belton, Tom	NJ
Buchanan, Gary	NJ
Connell, Bob	NJ
Danko, Mike	NJ
Eisele, Bill	NJ
Hughes, James	NJ
Litvin, Steve	NJ
McGeorge, Leslie	NJ
Mumman, Jim (retired 12/2002)	NJ
Weinstein, Mike	NJ
Page	
Johnson, Sandra	NOAA

Aldous, Kenneth	NY
Carcich, Italo <i>retired</i>	NY
Chytalo, Karen (out of NCA 10/02)	NY
deQuillfeldt, Charles	NY
Foley, Mike	NY
Myers, Jeff	NY
Nuzzi, Robert	NY
Roethel, Frank	NY
Swanson, Larry	NY
Wiggins, Mark	NY
Page	
O'Neil, Steve	PA
Page	
Deacutis, Chris	RI
Gibson, Mark	RI
Lynch, Jim	RI
O'Shea, Stephen	RI
Oviatt, Candace	RI
Pomeroy, Skip	RI
Powell, Chris	RI
Satchwell, Dick	RI
Scott, Tim	RI
Tate, Andrew	RI
Webb, Paul	RI



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment



Broad – National Coastal Survey

Approach:

- Utilize consistently measured indicators to assess and help explain estuarine condition
- Utilize Probability surveys
 - Extrapolates to all of estuarine waters
 - Addresses 305(b) requirements & GPRA
 - 100% assessed waters
- Incorporate existing monitoring programs, & develop hybrid monitoring designs



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Consistently Measured Indicators Coastal 2000 / NCA Core Indicators:

Water Quality

- dissolved oxygen
- salinity
- temperature
- pH
- depth
- light attenuation
- secchi depth
- dissolved nutrients
- chlorophyll a
- total suspended solids (*TSS*)

Sediment Quality

- sediment contaminants
 - . (*organics & metals*)
- sediment TOC
- sediment toxicity (amphipod)
- percent silt/clay

Biota

Fish/Shellfish

- community structure (*fish*)
- tissue contaminants
 - . (*organics & metals*)
- external pathology (*fish*)

Benthos

- community structure

Habitat

- SAV (presence/absence)
 - west coast & gulf coast*
- basic habitat type
 - (*e.g., open water, tidal flat*)
- marine debris (*presence/absence*)



National Coastal Assessment



Approach in Northeast

Consider Merger of Existing Monitoring Programs with Probability Survey Designs

Existing Programs –

- fiscal and human resource investment
- valuable environmental information



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment



Choices for Existing Programs

Replace all existing sites with randomly selected stations

- lose ability to track trends

- loss of investment in data

Use existing sites

- inferences to non-sampled sites?



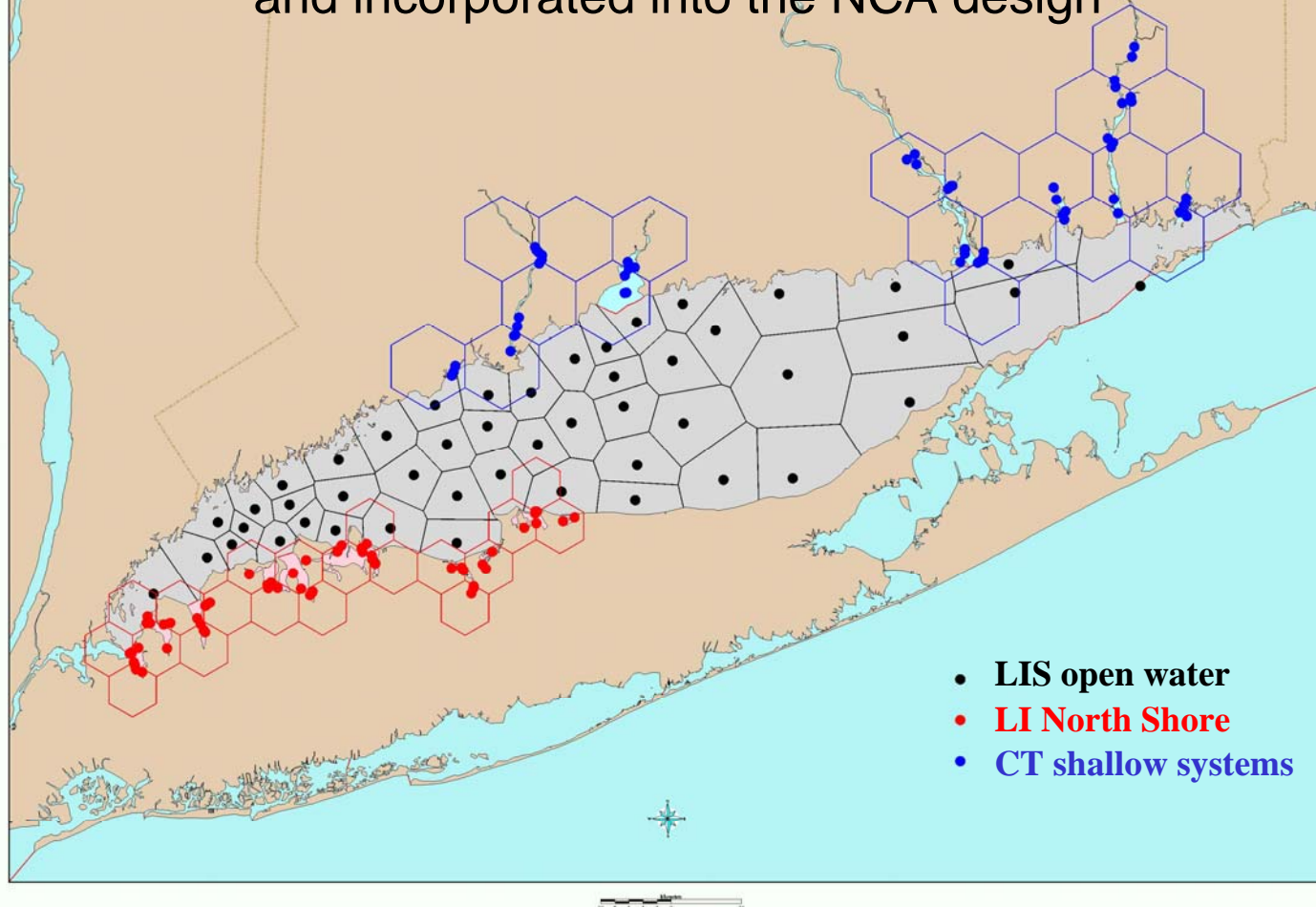
RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment



Combined set of Long Island Sound Study sites could be treated as probability sites representative of the open water portion of the Sound and incorporated into the NCA design



- LIS open water
- LI North Shore
- CT shallow systems



RESEARCH & DEVELOPMENT

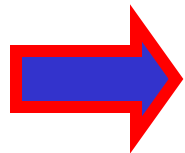
Building a scientific foundation for sound environmental decisions

National Coastal Assessment

Talk Outline:

- Role of the National Coastal Assessment
 - Goals
 - Strategy
 - Approach

Broad – National Coastal Surveys



- Preliminary Findings in the Northeast

- Next Steps for Analysis & Reporting

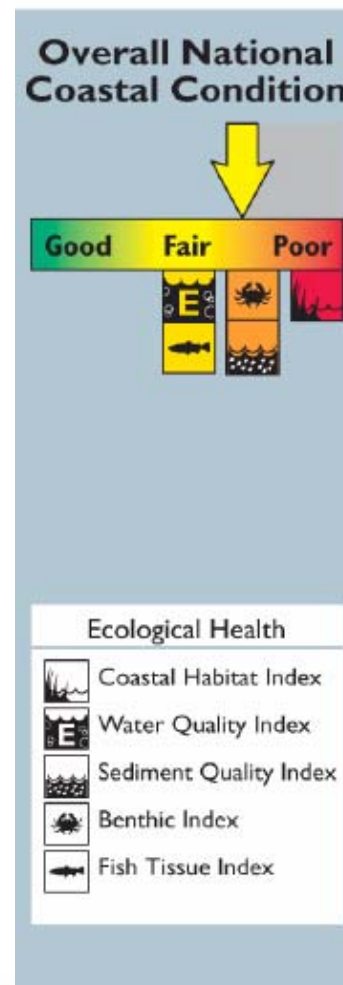
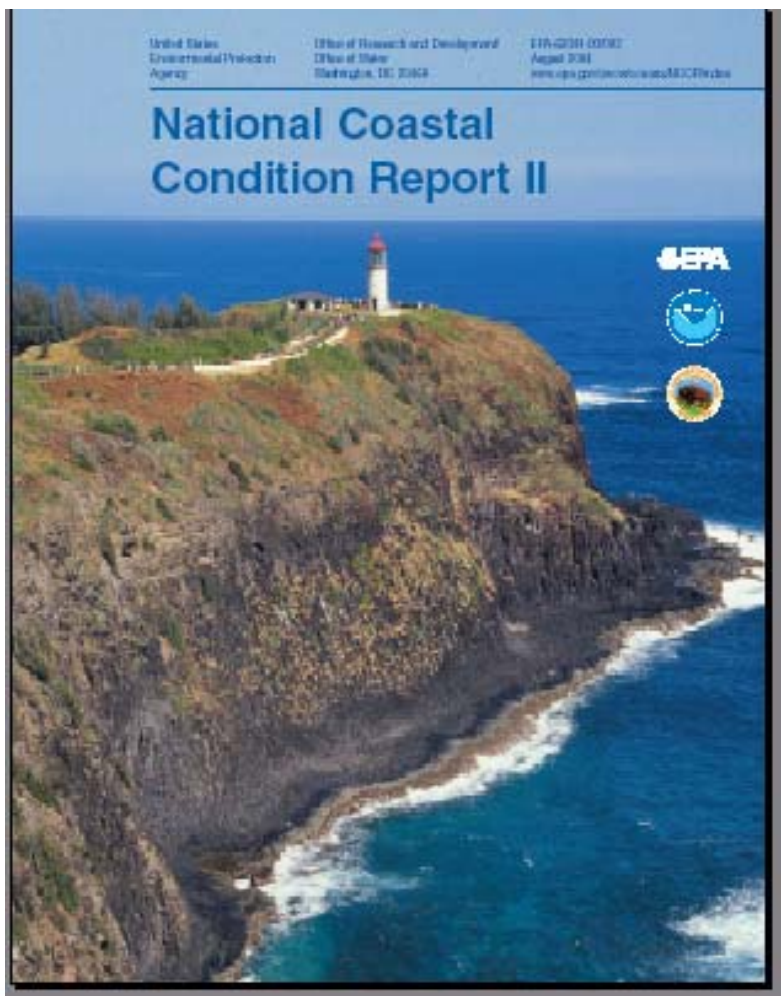


RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Condition Report II

Currently Available for Public Comment

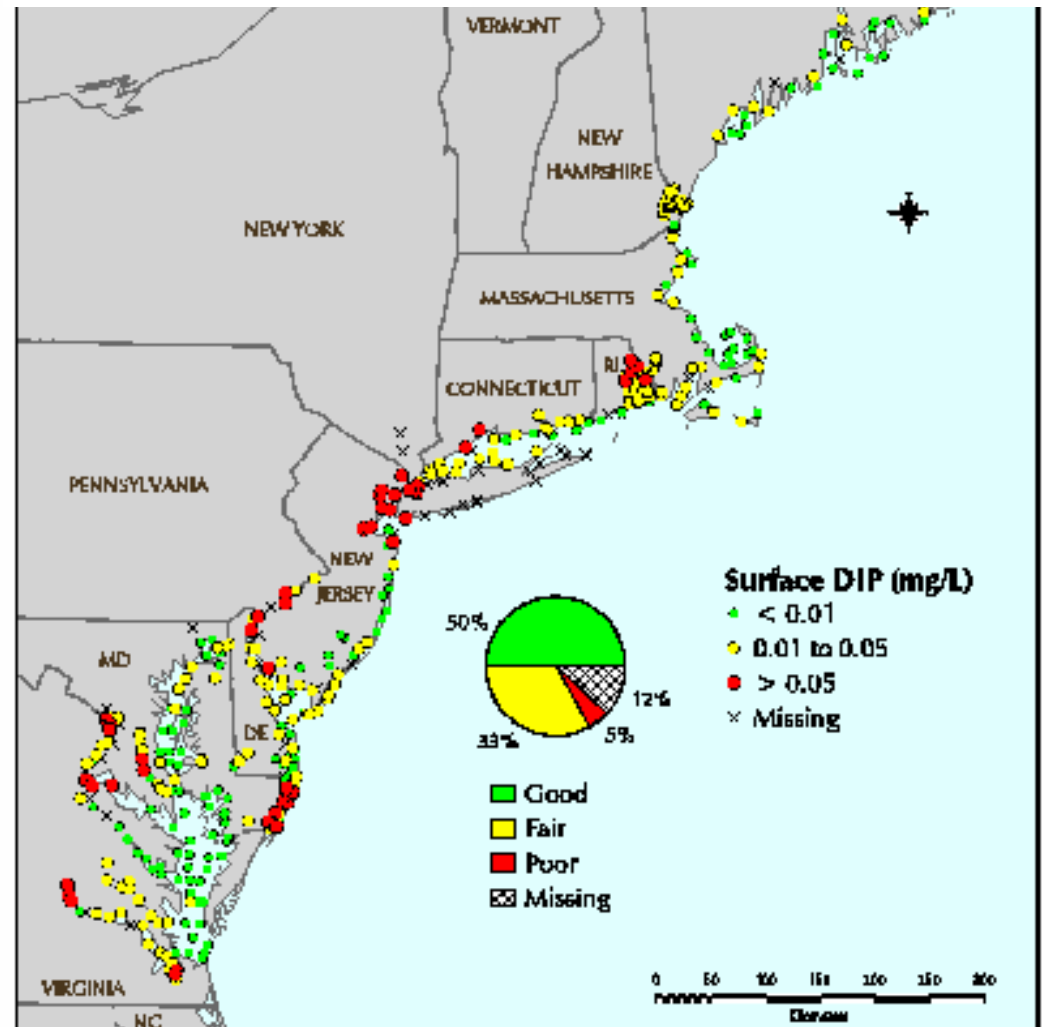
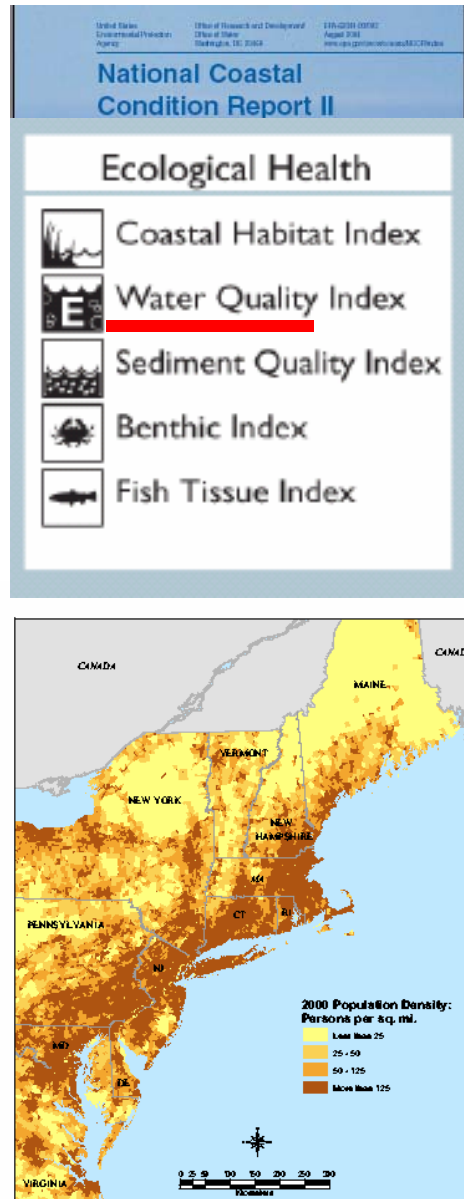


RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

NCCRII – Chapter 3

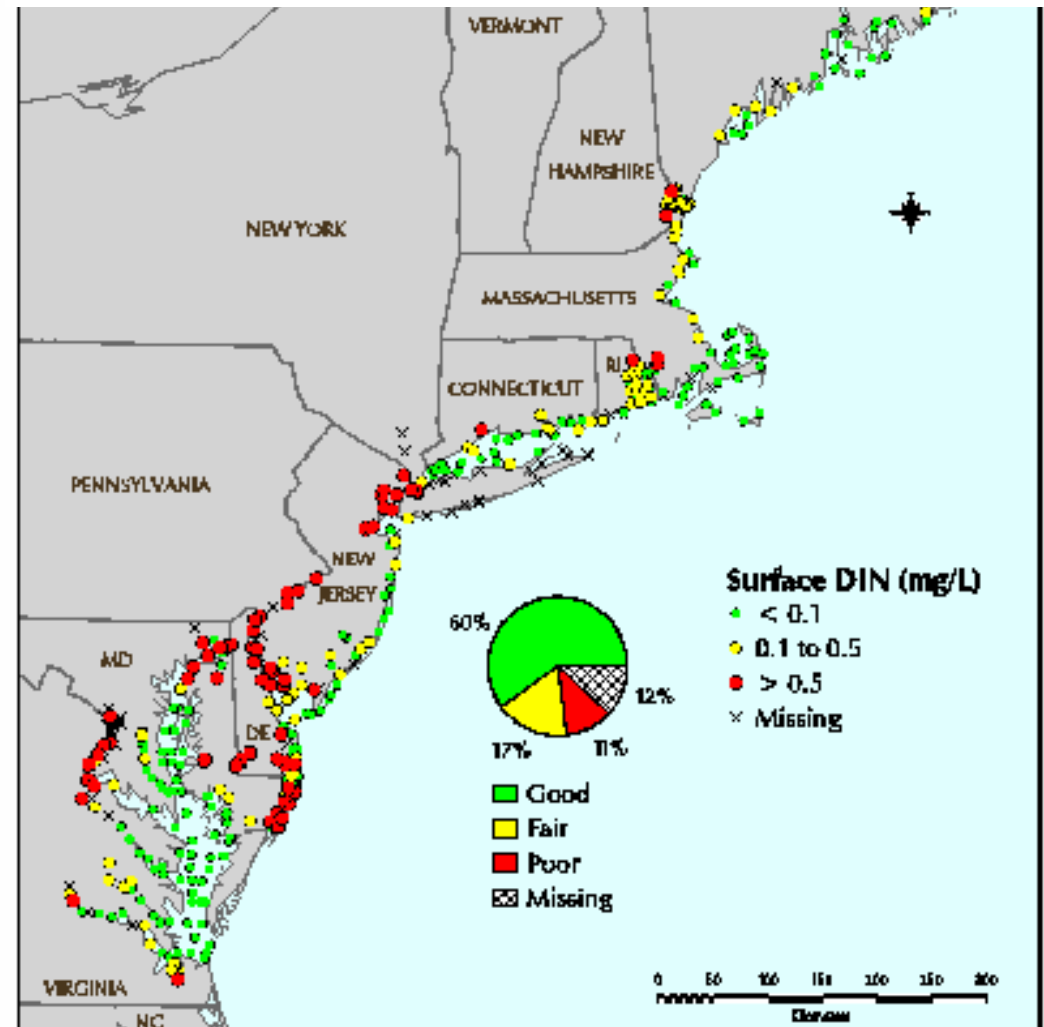
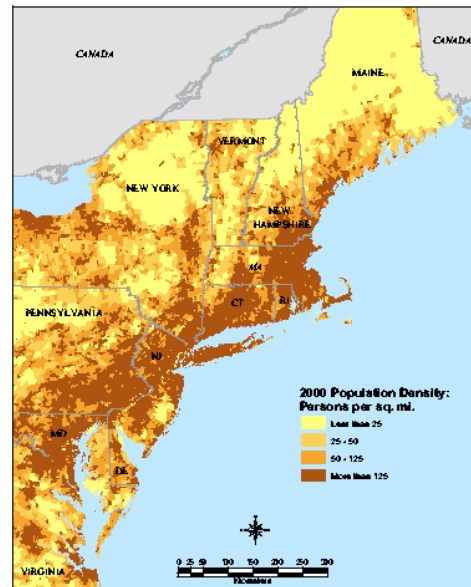
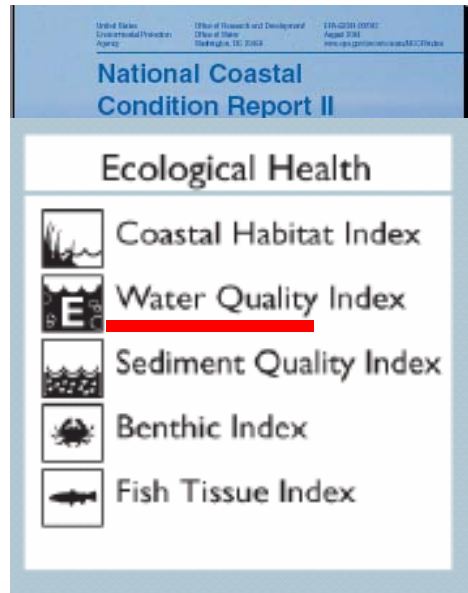
NCA Findings in Northeast



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

NCCR II – Chapter 3 NCA Findings in Northeast

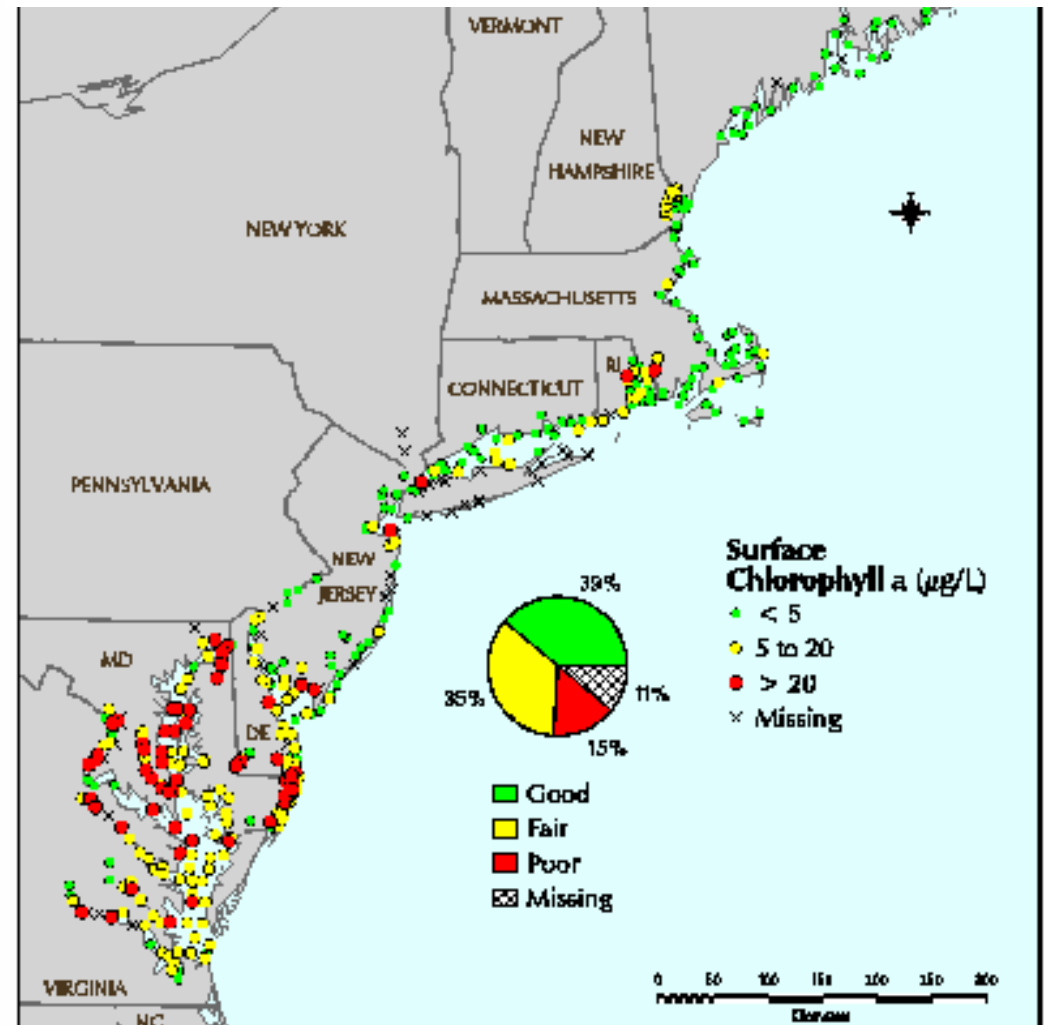
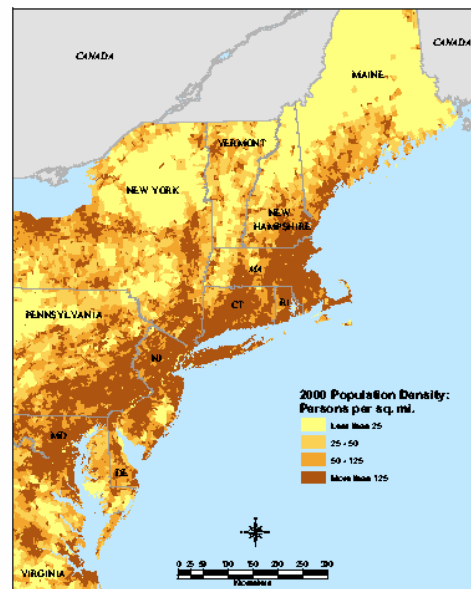
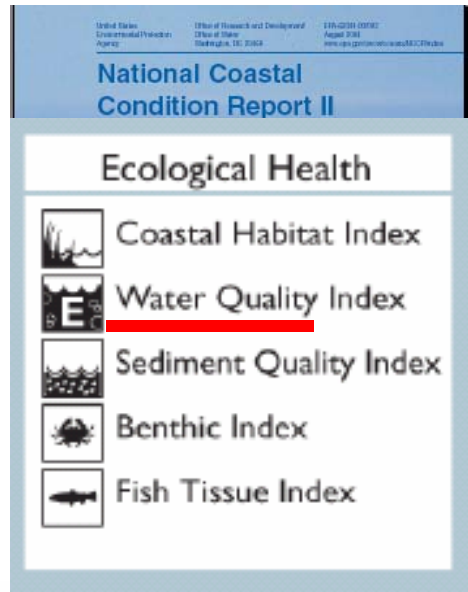


RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

NCCRII – Chapter 3

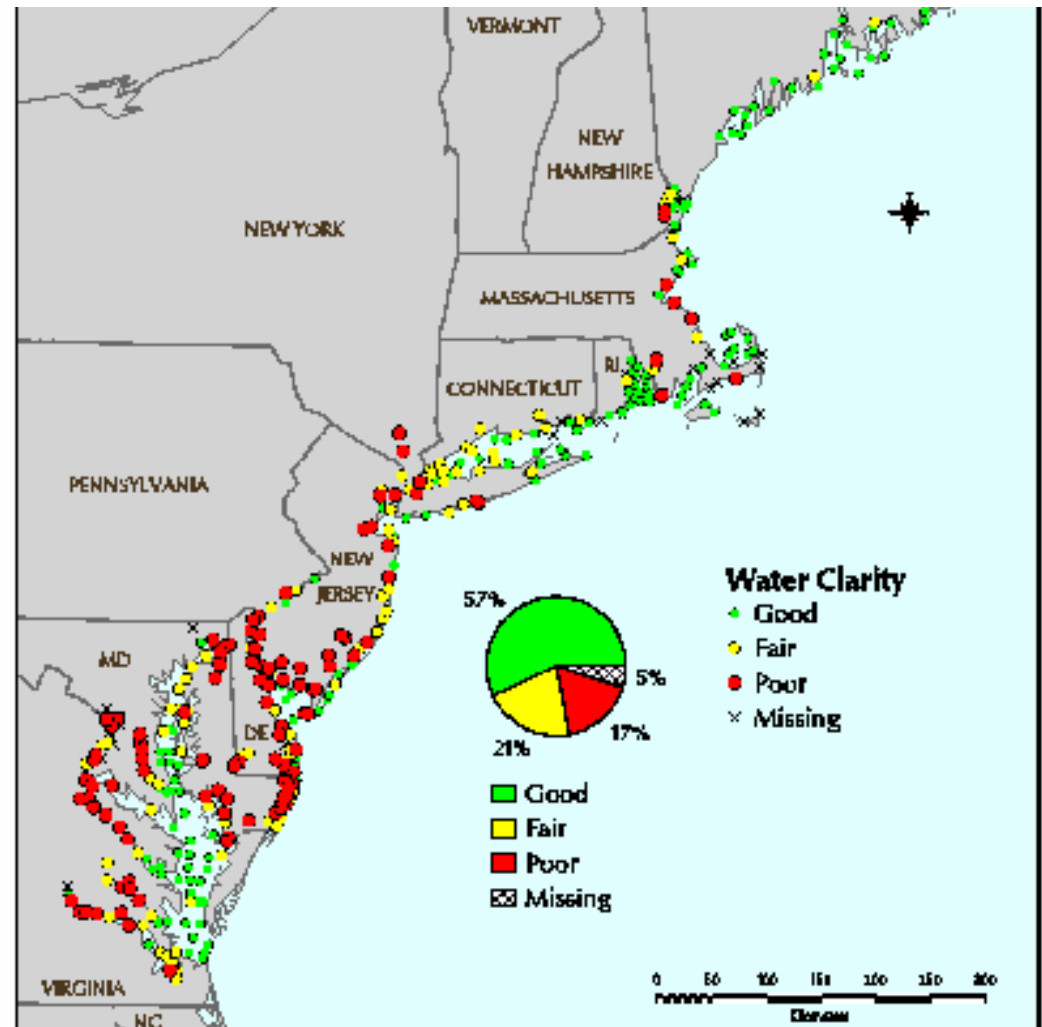
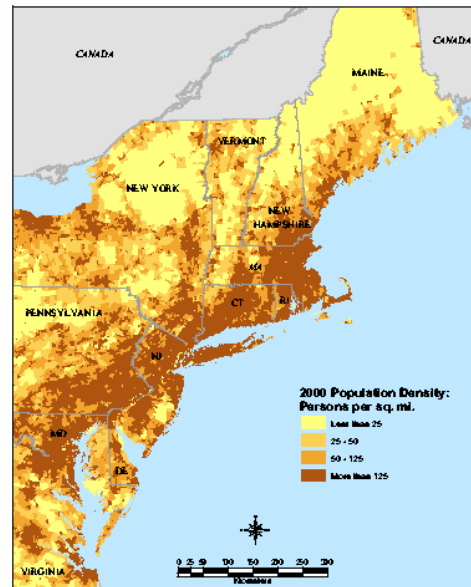
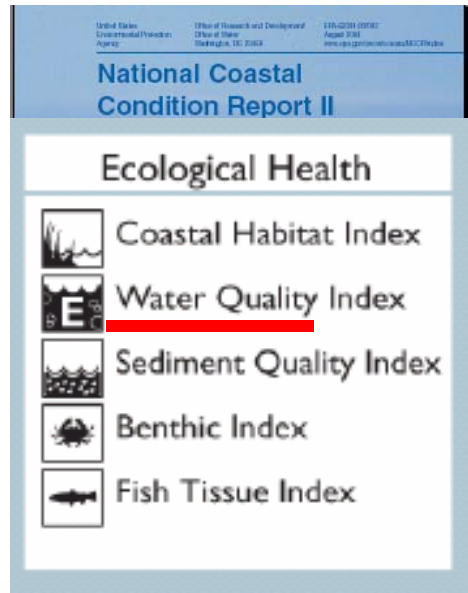
NCA Findings in Northeast



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

NCCRII – Chapter 3 NCA Findings in Northeast

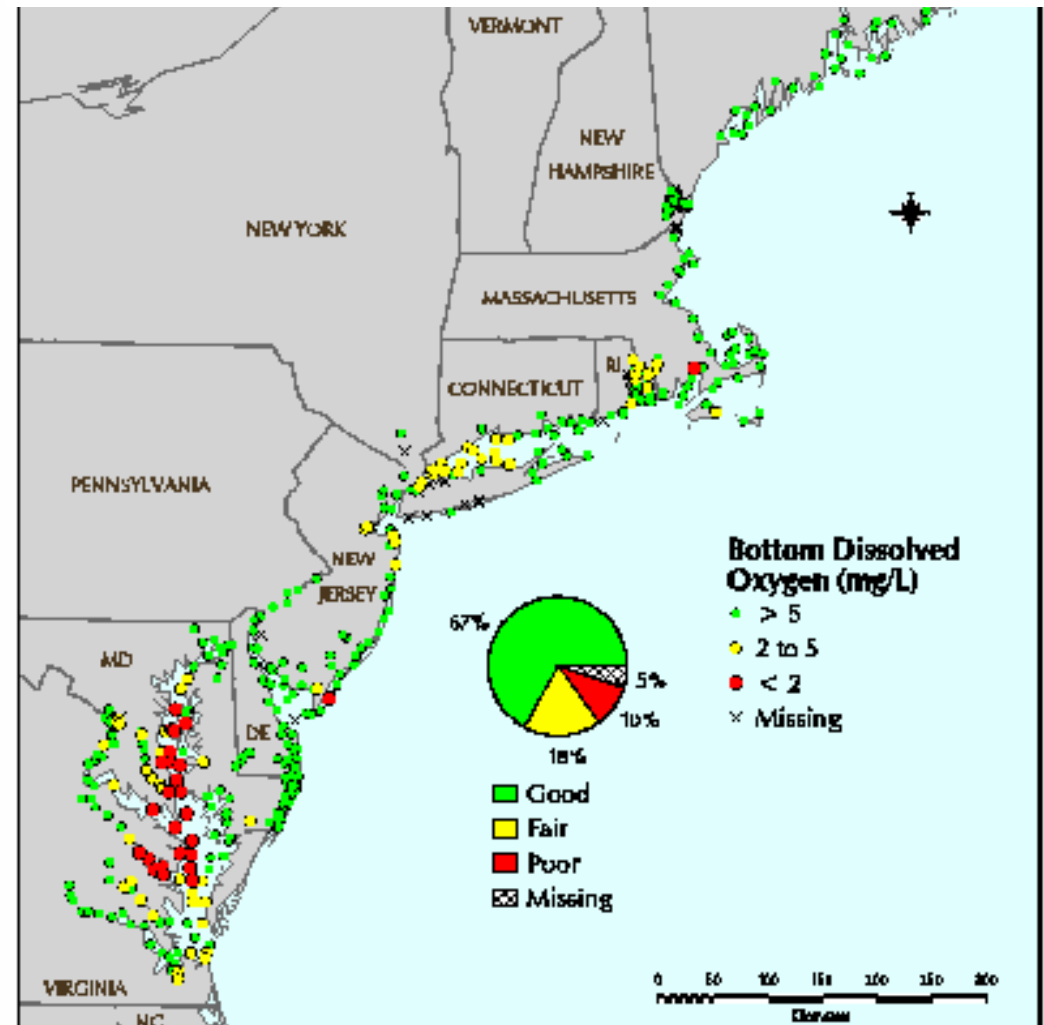
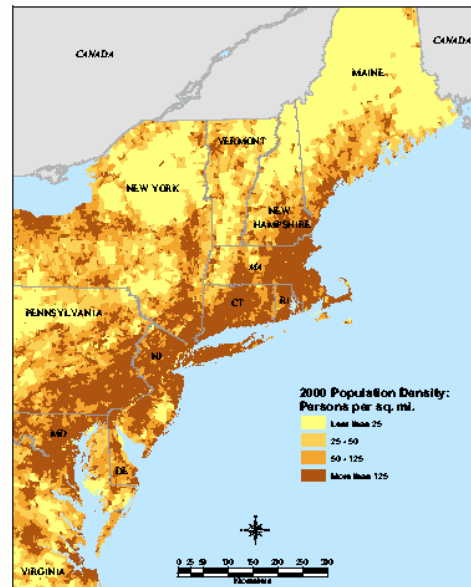
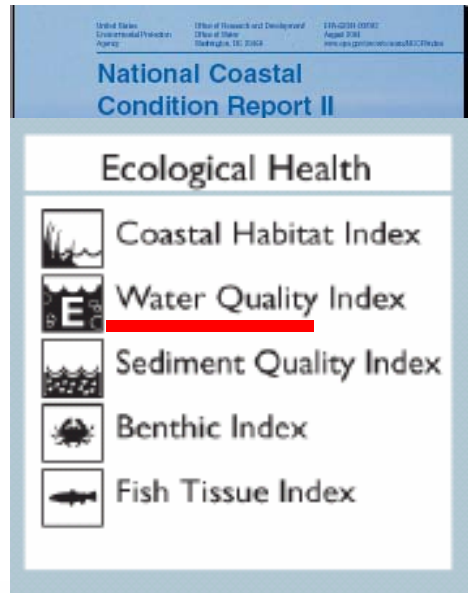


RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

NCCRII – Chapter 3

NCA Findings in Northeast

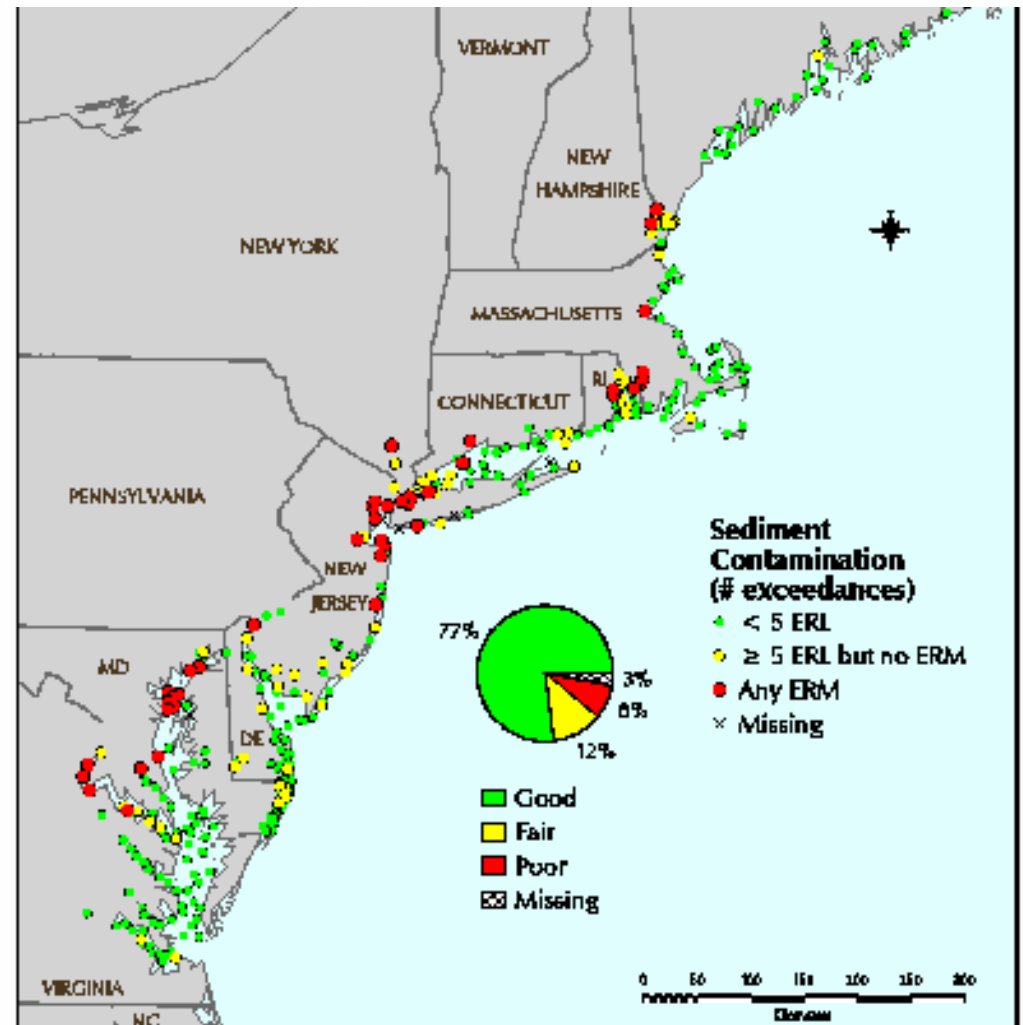
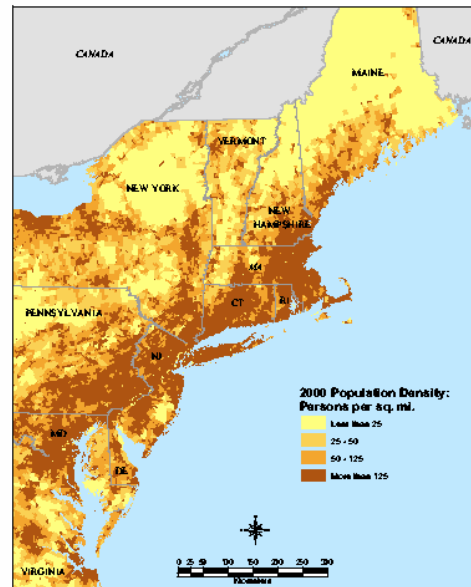
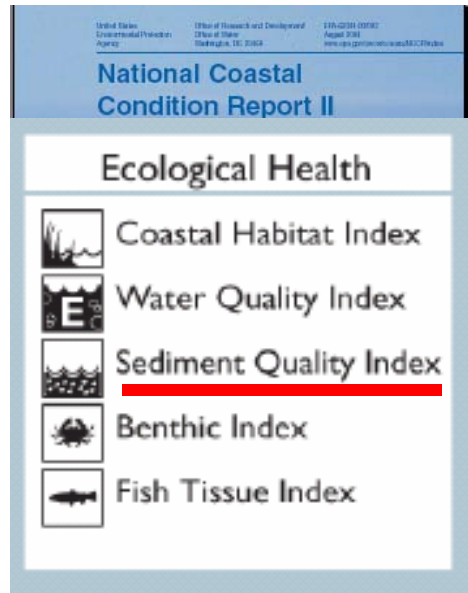


RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

NCCRII – Chapter 3

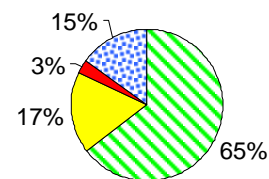
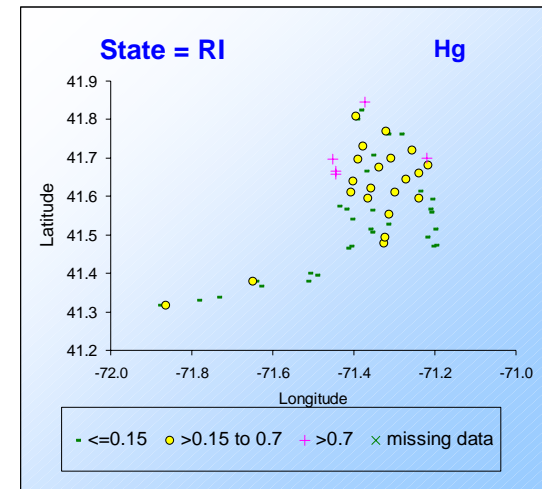
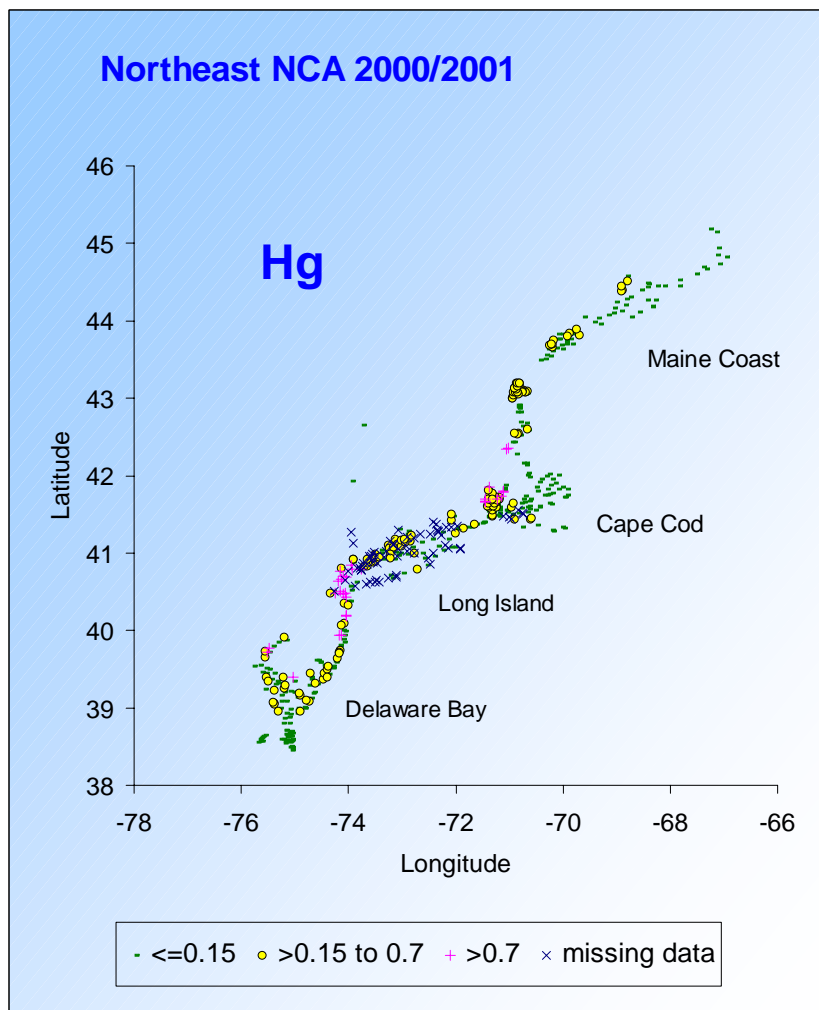
NCA Findings in Northeast



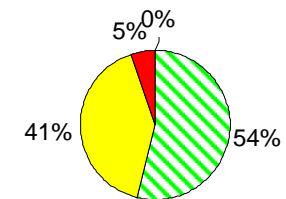
RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Interactive Map Making. State Data in Regional Context.



Northeast Estuaries



RI Estuaries

Legend:
 - ≤ 0.15
 - > 0.15 to 0.7
 - > 0.7
 - missing data

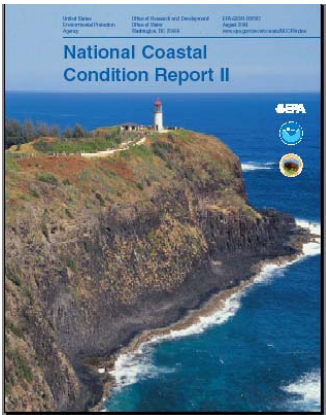
Simple Interactive Tools to Visualize and Analyze NCA Data



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

The Role of the National Coastal Assessment



Report Highlights:
help illustrate “research and monitoring
within an integrated assessment framework”

- **Tier 1: Characterization of the Problem**
 - Broad scale response properties
 - (surveys, automated collection and / or remote sensing)
- **Tier 2: Diagnosis of Causes**
 - Issue or resource specific surveys and observations
 - (focusing on cause and effect interactions)
- **Tier 3: Diagnosis of Interactions and Forecasting**
 - Intensive monitoring and research index sites with higher spatial and temporal resolution to determine specific mechanisms of interaction.
 - Needed to build cause and effect models

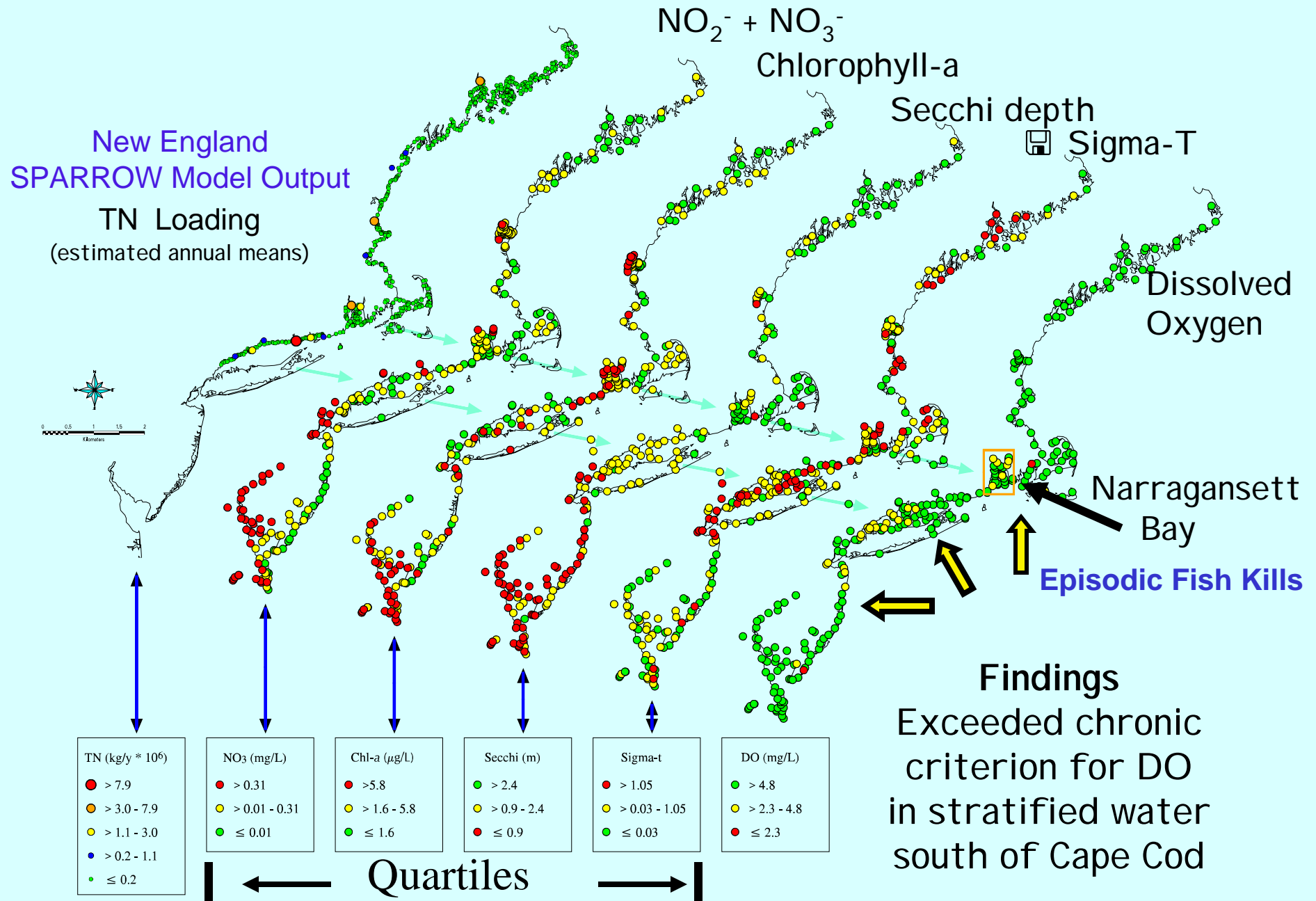


RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment: Regional Characterization

Probabilistic sampling design / Summer 2000.





*In Upper Narragansett Bay, RI
Episodic Fish Kills*



Fish Kill 6 / 28 / 01 – Greenwich Bay

Surface D.O. : 3.8 mg/l inshore; 6.0 mg/L offshore

Bottom D.O. : < .05 mg/L near shore @ 1.8 m ;

0.6 mg/L offshore @ 3 m

9/21/2000 11:48am



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Narragansett Bay

Temporal variability in surface and bottom DO studies
using automated time-series measurement systems.

*Dana Kester et al,
Detailed diagnostic studies at fixed station network*

***Narragansett & Mt Hope Bay: Automated Instrumentation at 12 sites
sensors 0.5 m below the surface and 1.0 m above the bottom :
T, S, O₂, Chl Fluorescence, & Water level***

Greenwich Bay



University of Rhode Island, Graduate
School of Oceanography (stations 1 thru 6)

RI DEM

Roger Williams Univ.,

University of Mass
(Boston and Dartmouth)

Mass. Coastal Zone Management Office.

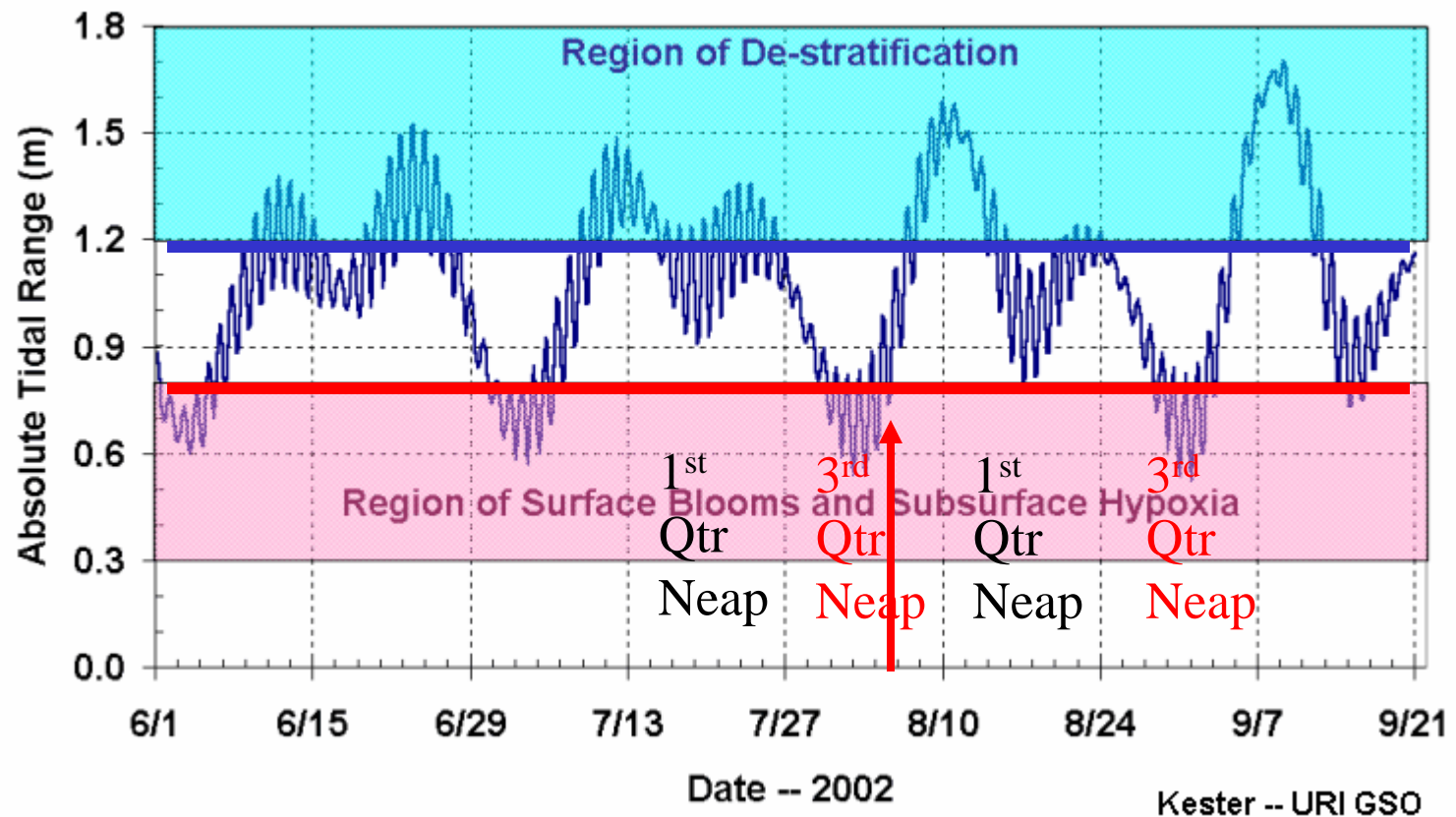


RESEARCH & DEVELOPMENT

<http://www.gso.uri.edu/> Building a scientific foundation for sound environmental decisions

*Dana Kester, URI Grad School of Oceanography
Detailed diagnostic studies at fixed station network*

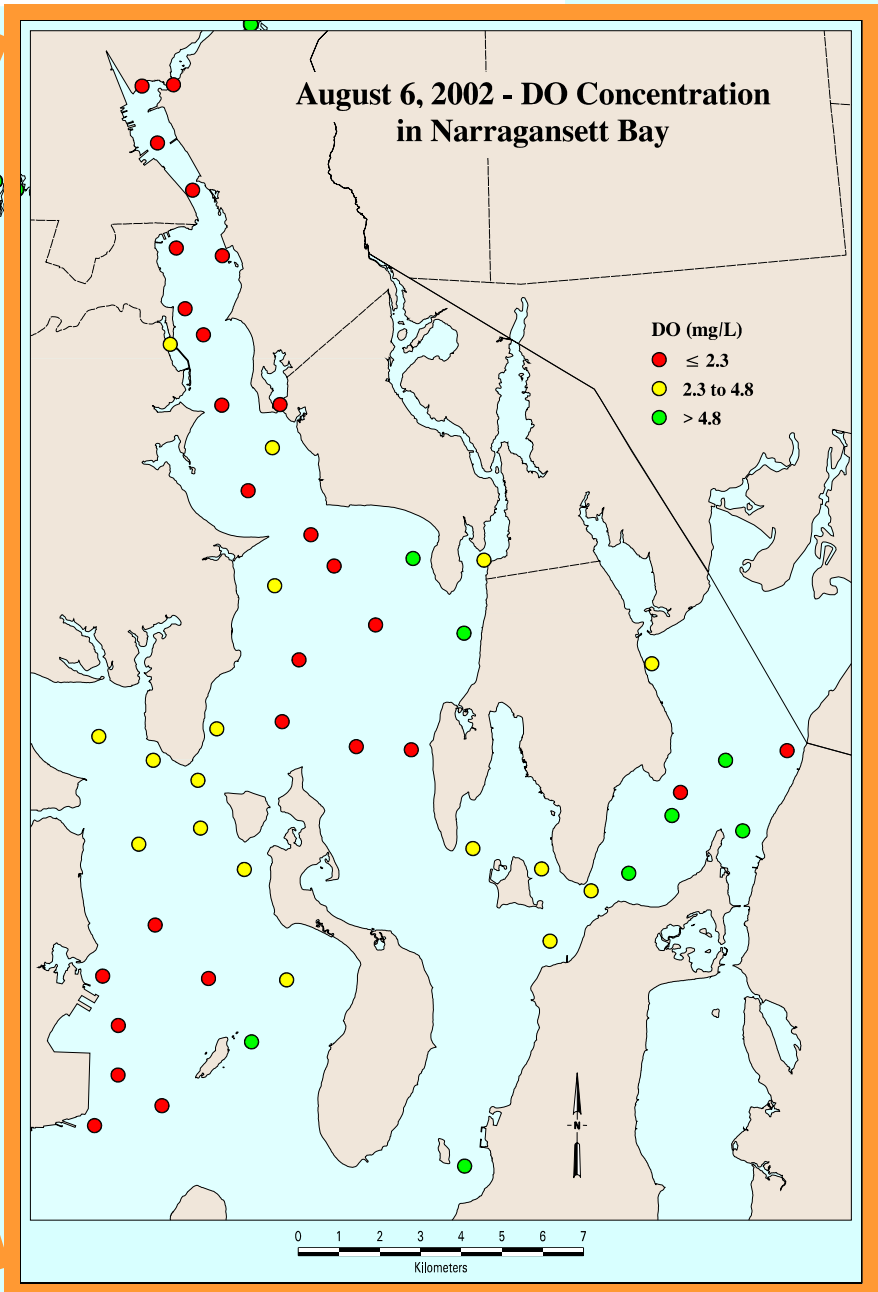
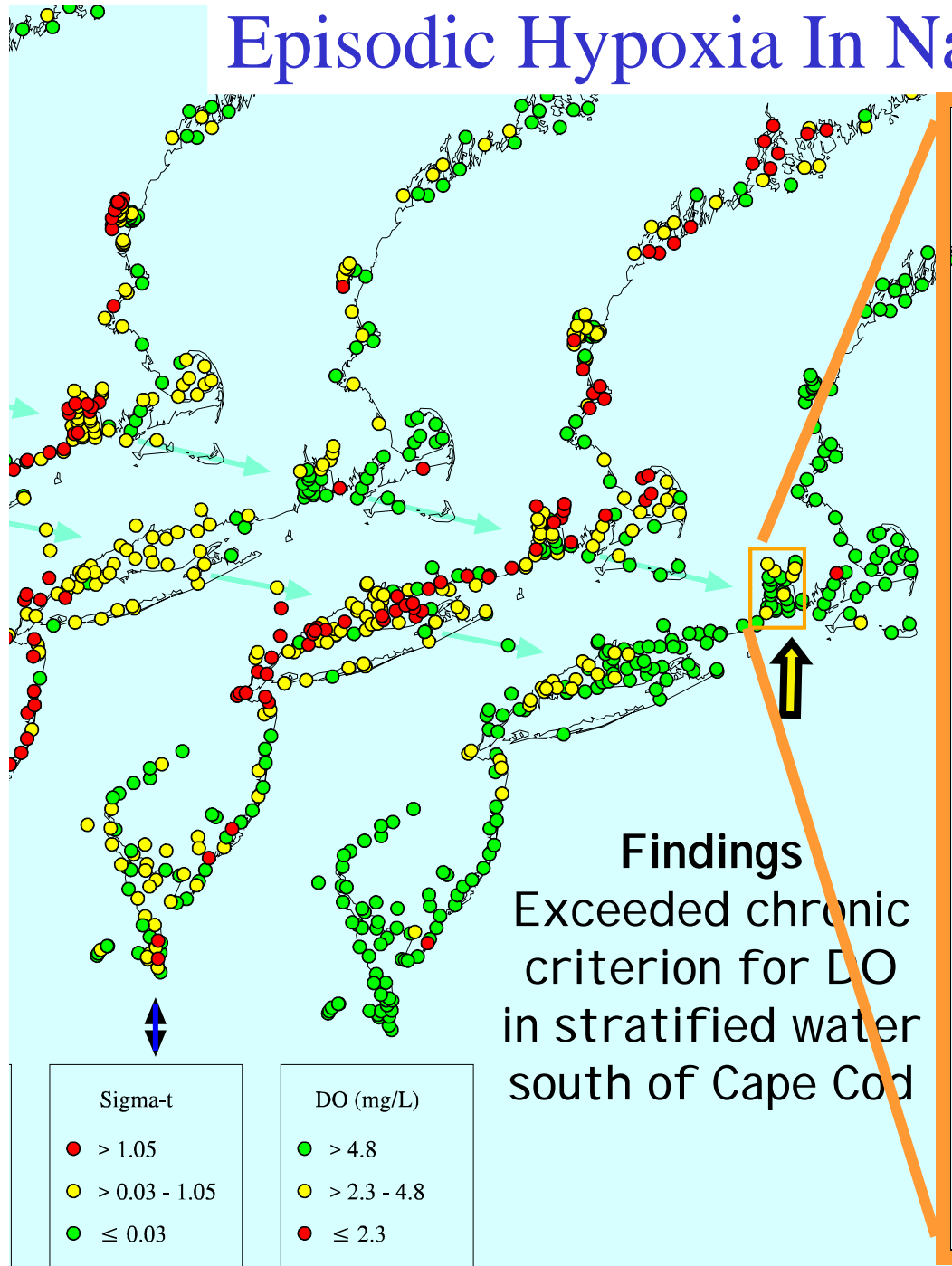
*Narragansett & Mt Hope Bay: Automated Instrumentation at 12 sites
sensors 0.5 m below the surface and 1.0 m above the bottom :
T, S, O₂, Chl Fluorescence, & Water level*



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Episodic Hypoxia In Narragansett Bay

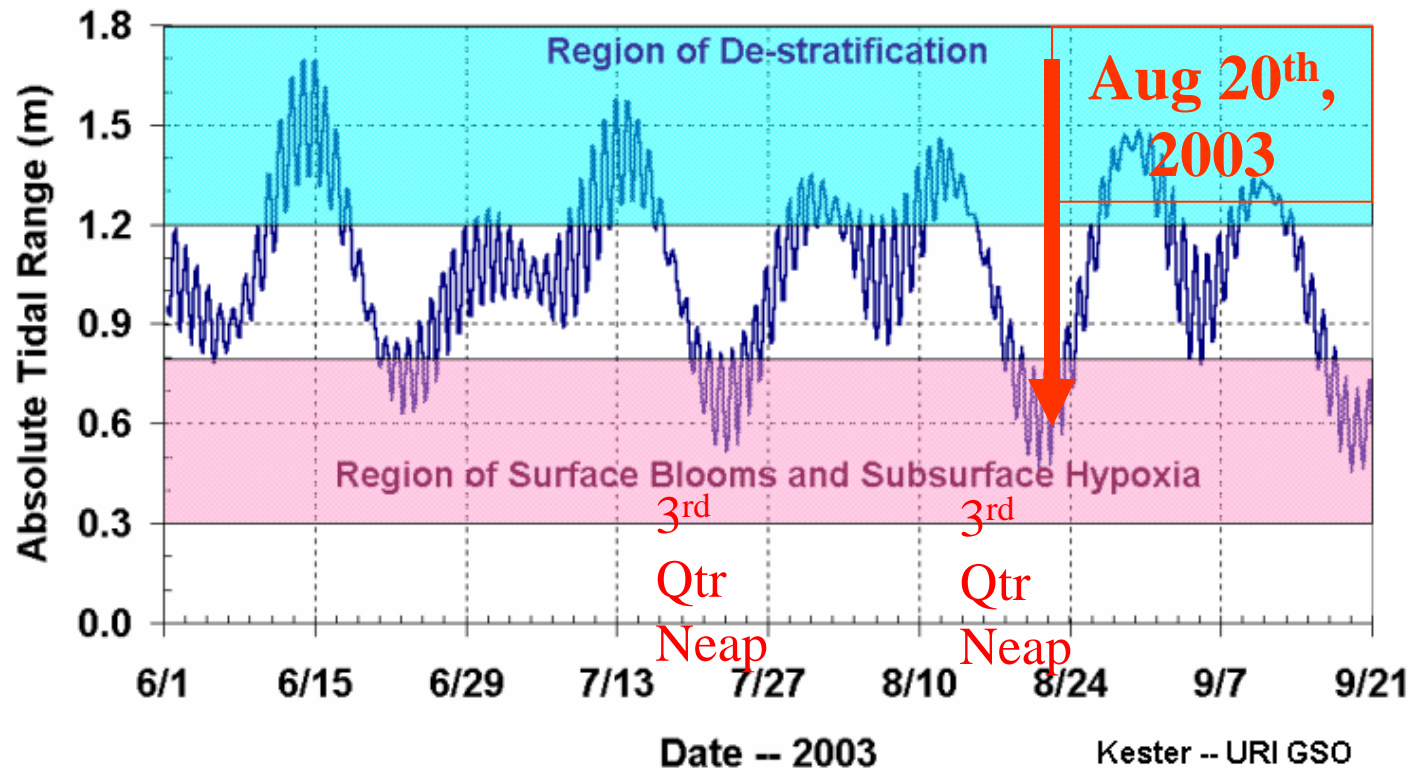


Implications for Forecasting

When is low dissolved oxygen likely in Narragansett Bay ?

Prediction: Low DO event possible in late July & late Aug 2003.

(Dana Kester, URI -GSO)



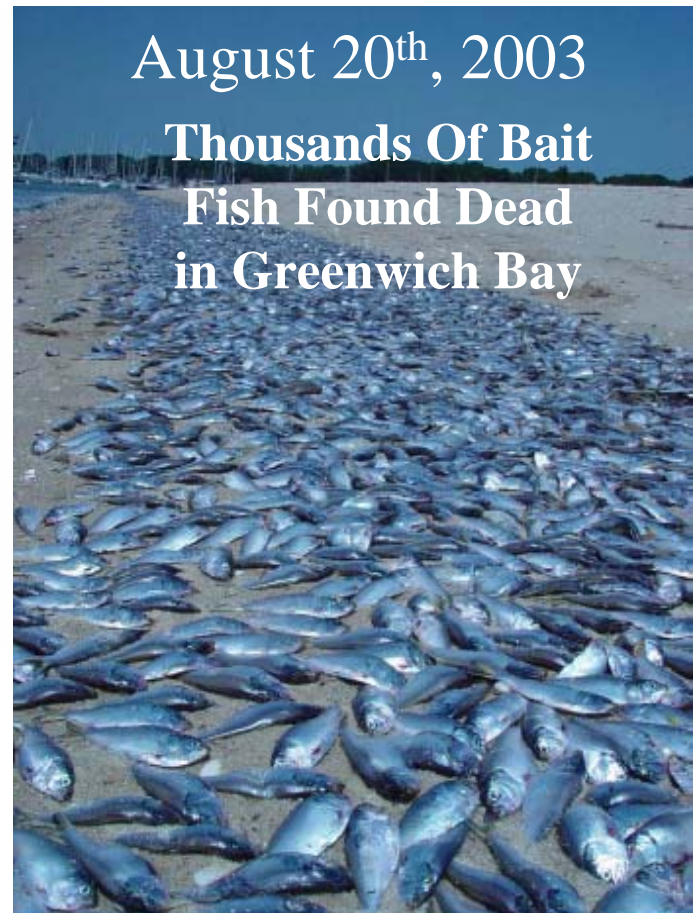
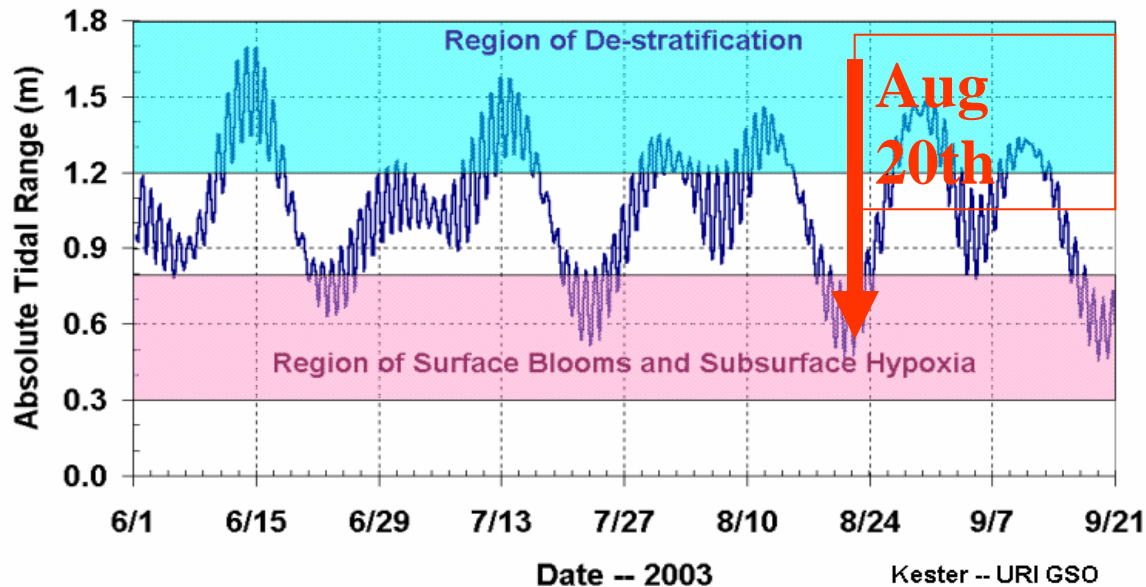
RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Dissolved Oxygen in Narragansett Bay

Summer of 2003 was wet.

Extent and persistence of low DO water was greater than in 2002.



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Research and Monitoring within an Integrated Assessment Framework

SPATIAL:

- Broad scale probabilistic resource surveys

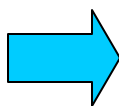
TEMPORAL:

- Moored instrumentation at specific locations
- Targeted sampling during periods of increased water column stratification



Next Steps for Analysis & Reporting:

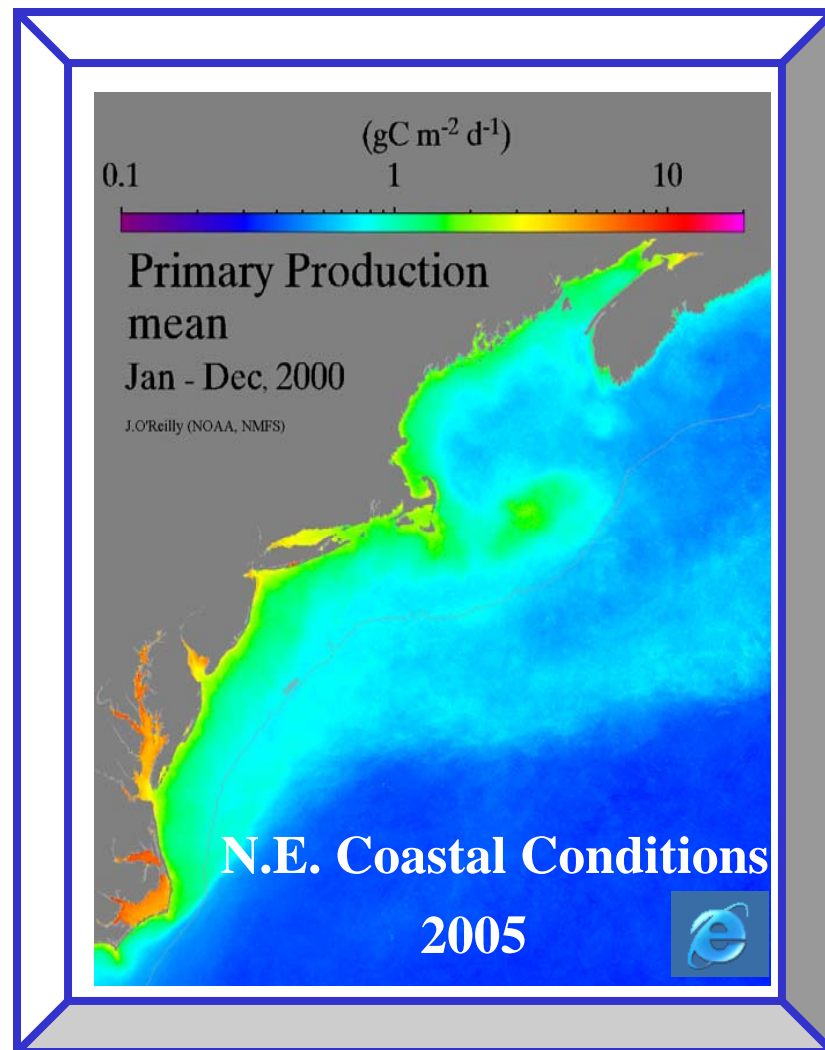
Electronic Web-Based Reporting



possibly with active links to:

- 1) NCA data,
- 2) Analysis Tools (Excel, GIS, etc)
- 3) National Estuary Programs
- 4) State Environmental Management Programs

The approach will facilitate technology transfer to the States



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

National Coastal Assessment: Approach and Findings in the Northeast

**Henry Walker ¹, John Kiddon ¹,
Harry Buffum², Michael Charpentier²,
Gerald Pesch¹, Donald Cobb¹, and Walt Galloway¹**

¹ Atlantic Ecology Division
National Health and Environmental Effects Research Laboratory
U.S. Environmental Protection Agency
Narragansett, Rhode Island 02882

² CSC Corporation
Narragansett, Rhode Island 02882